

- 1 - iAP20 Rec'd PCT/PTO 15 JUN 2006

Sequence Listing

<110> Merck Patent GmbH

<120> DNA sequence, and recombinant preparation of group 4 major allergens from cereals

<130> P 03/239

<140> DE 10359351.9

<141> 2003-12-16

<160> 44

<170> PatentIn version 3.1

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Gln	Ala	Ala	Ala	Ala	Ala	Tyr	Ala	Pro	Val	Pro	Ala	Lys	Ala	Asp	Phe	
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Thr	Asn	Ala	Ser	His	Ile	Gln	Ser	Ala	Val	Val	Cys	Gly	Arg	Arg	His	
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Gly Lys Val Asp Pro Gln Asp Tyr Phe Arg Asn Glu Gln Ser Ile Pro
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Ser Ser Pro Asp Tyr Pro Thr Val Leu Ala Gln Thr Ile Arg Asn Ser
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Arg Trp Ser Ser Pro Gln Asn Val Lys Pro Ile Tyr Ile Ile Thr Pro
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Gly Ile Met Ile Met Asp Pro Tyr Gly Ala Thr Ile Ser Ala Thr Pro
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Glu Ala Ala Thr Pro Phe Pro His Arg Gln Gly Val Leu Phe Asn Ile
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Gln Tyr Val Asn Tyr Trp Phe Ala Glu Ser Ala Gly Ala Ala Pro Leu
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Gln Trp Ser Lys Asp Ile Tyr Lys Phe Met Glu Pro Tyr Val Ser Lys
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Cys	His	Ala	Ala	Val	Ser	Tyr	Ala	Ala	Ala	Pro	Val	Pro	Ala	Lys	Glu	
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Ala	Lys	Ser	Ser	Pro	Ala	Phe	Pro	Thr	Val	Leu	Ala	Gln	Thr	Ile	Arg	
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Asn	Ser	Arg	Trp	Ser	Ser	Pro	Gln	Ser	Val	Lys	Pro	Leu	Tyr	Ile	Ile	
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Thr	Pro	Thr	Asn	Ala	Ser	His	Ile	Gln	Ser	Ala	Val	Val	Cys	Gly	Arg	
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Arg	His	Gly	Val	Arg	Ile	Arg	Val	Arg	Ser	Gly	Gly	His	Asp	Tyr	Glu	

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Lys	Ala	Leu	Thr	Pro	Leu	Met	Ser	Ser	Arg	Phe	Pro	Glu	Leu	Gly	Met		
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Asn	Ala	Ser	His	Cys	Asn	Glu	Met	Pro	Trp	Ile	Lys	Ser	Val	Pro	Phe		
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Phe	Asn	Ile	Gln	Tyr	Val	Asn	Tyr	Trp	Phe	Asp	Glu	Ala	Gly	Gly	Ala	
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Ala	Pro	Leu	Gln	Trp	Ser	Lys	Asp	Met	Tyr	Arg	Phe	Met	Glu	Pro	Tyr	
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Lys	Val	Trp	Gly	Glu	Lys	Tyr	Phe	Lys	Gly	Asn	Phe	Gln	Arg	Leu	Ala	
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Ser	Ile	Pro	Pro	Leu	Leu	Gly	Lys									
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a																1644

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<211> 520

<212> PRT

<213> Secale cereale

<400> 4

Asn	Ser	Arg	Ala	Phe	Ala	Leu	Val	Pro	Leu	Leu	Ile	Cys	Val	Leu	Ser
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Cys His Ala Ala Val Ser Tyr Ala Ala Ala Pro Val Pro Ala Lys Glu
 20 25 30

Asp Phe Phe Gly Cys Leu Val Lys Glu Ile Pro Ala Arg Leu Leu Tyr
 35 40 45

Ala Lys Ser Ser Pro Ala Phe Pro Thr Val Leu Ala Gln Thr Ile Arg
 50 55 60

Asn Ser Arg Trp Ser Ser Pro Gln Ser Val Lys Pro Leu Tyr Ile Ile
 65 70 75 80

Thr Pro Thr Asn Ala Ser His Ile Gln Ser Ala Val Val Cys Gly Arg
 85 90 95

Arg His Gly Val Arg Ile Arg Val Arg Ser Gly Gly His Asp Tyr Glu
 100 105 110

Gly Leu Ser Tyr Arg Ser Glu Arg Pro Glu Ala Phe Ala Val Val Asp
 115 120 125

Leu Asn Lys Met Arg Ala Val Val Val Asp Gly Lys Ala Arg Thr Ala
 130 135 140

Trp Val Asp Ser Gly Ala Gln Leu Gly Glu Leu Tyr Tyr Ala Ile Ala
 145 150 155 160

Lys Asn Ser Pro Val Leu Ala Phe Pro Ala Gly Val Cys Pro Thr Ile
 165 170 175

Gly Val Gly Gly Asn Phe Ala Gly Gly Gly Phe Gly Met Leu Leu Arg
 180 185 190

Lys Tyr Gly Ile Ala Ala Glu Asn Val Ile Asp Val Lys Val Val Asp
 195 200 205

Ala Asn Gly Thr Leu Leu Asp Lys Ser Ser Met Ser Ala Asp His Phe
 210 215 220

Trp Ala Val Arg Gly Gly Gly Gly Glu Ser Phe Gly Ile Val Val Ser
 225 230 235 240

Trp Gln Val Lys Leu Leu Pro Val Pro Pro Thr Val Thr Val Phe Lys
 245 250 255

Ile Pro Lys Thr Val Gln Glu Gly Ala Val Glu Leu Ile Asn Lys Trp
 260 265 270

Gln Leu Val Ala Pro Ala Leu Pro Asp Asp Leu Met Ile Arg Ile Ile
 275 280 285

Ala Phe Gly Gly Thr Ala Lys Phe Glu Ala Met Tyr Leu Gly Thr Cys
 290 295 300

Lys Ala Leu Thr Pro Leu Met Ser Ser Arg Phe Pro Glu Leu Gly Met
 305 310 315 320

Asn Ala Ser His Cys Asn Glu Met Pro Trp Ile Lys Ser Val Pro Phe
 325 330 335

Ile His Leu Gly Lys Gln Ala Thr Leu Ser Asp Leu Leu Asn Arg Asn
 340 345 350

Asn Thr Phe Lys Pro Phe Ala Glu Tyr Lys Ser Asp Tyr Val Tyr Gln
 355 360 365

Pro Val Pro Lys Pro Val Trp Ala Gln Ile Phe Val Trp Leu Val Lys
 370 375 380

Pro Gly Ala Gly Ile Met Val Met Asp Pro Tyr Gly Ala Ala Ile Ser
 385 390 395 400

Ala Thr Pro Glu Ala Ala Thr Pro Phe Pro His Arg Lys Asp Val Leu
 405 410 415

Phe Asn Ile Gln Tyr Val Asn Tyr Trp Phe Asp Glu Ala Gly Gly Ala
 420 425 430

Ala Pro Leu Gln Trp Ser Lys Asp Met Tyr Arg Phe Met Glu Pro Tyr
 435 440 445

Val Ser Lys Asn Pro Arg Gln Ala Tyr Ala Asn Tyr Arg Asp Ile Asp
 450 455 460

Leu Gly Arg Asn Glu Val Val Asn Asp Ile Ser Thr Tyr Ala Ser Gly
 465 470 475 480

Lys Val Trp Gly Glu Lys Tyr Phe Lys Gly Asn Phe Gln Arg Leu Ala
 485 490 495

Ile Thr Lys Gly Lys Val Asp Pro Gln Asp Tyr Phe Arg Asn Glu Gln
 500 505 510

Ser Ile Pro Pro Leu Leu Gly Lys

515

520

<210> 5

<211> 1608

<212> DNA

<213> Hordeum vulgare

<220>

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<222> (1555) .. (1557)

<223>

<220>

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<222> (1) .. (66)

<223>

<220>

<221> signal_sequence_PROT

<222> (1) .. (22)

<223>

<220>

<221> CDS

<222> (1) .. (1557)

<223>

<400> 5

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Ser	Ser	Arg	Ala	Phe	Ala	Leu	Val	Leu	Leu	Leu	Cys	Ala	Leu	Ser	Cys	
1				5				10					15			

cac	cac	gct	gcc	gtc	tcc	tcc	gcg	cag	gtg	ccg	gcc	aag	gac	gac	ttc	96
His	His	Ala	Ala	Val	Ser	Ser	Ala	Gln	Val	Pro	Ala	Lys	Asp	Asp	Phe	
		20						25					30			

ctg	gga	tgc	ctc	gtg	aag	gag	ata	ccg	gcc	cgc	ctc	ctc	ttc	gcc	aag	144
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Leu	Gly	Cys	Leu	Val	Lys	Glu	Ile	Pro	Ala	Arg	Leu	Leu	Phe	Ala	Lys	
		35					40					45				
agc	tcg	cct	gcc	ttc	ccc	gcc	gtc	ctg	gag	cag	acc	atc	agg	aac	tcg	192
Ser	Ser	Pro	Ala	Phe	Pro	Ala	Val	Leu	Glu	Gln	Thr	Ile	Arg	Asn	Ser	
	50					55					60					
cgg	tgg	tcg	tcg	ccg	cag	aac	gtg	aag	ccg	ctc	tac	atc	atc	acc	ccc	240
Arg	Trp	Ser	Ser	Pro	Gln	Asn	Val	Lys	Pro	Leu	Tyr	Ile	Ile	Thr	Pro	
65					70				75						80	
acc	aac	acc	tcc	cac	atc	cag	tct	gct	gtg	gtg	tgc	ggc	cgc	cgg	cac	288
Thr	Asn	Thr	Ser	His	Ile	Gln	Ser	Ala	Val	Val	Cys	Gly	Arg	Arg	His	
				85				90						95		
ggc	gtc	cgc	ctc	cgc	gtg	cgg	agc	ggc	ggc	cac	gac	tac	gag	ggc	ctg	336
Gly	Val	Arg	Leu	Arg	Val	Arg	Ser	Gly	Gly	His	Asp	Tyr	Glu	Gly	Leu	
			100					105					110			
tcg	tac	cgg	tcc	gag	cgc	ccc	gag	gcg	ttc	gcc	gtc	gta	gac	ctc	aac	384
Ser	Tyr	Arg	Ser	Glu	Arg	Pro	Glu	Ala	Phe	Ala	Val	Val	Asp	Leu	Asn	
		115					120					125				
aag	atg	cgg	acc	gtg	ttg	gtc	aac	gaa	aag	gcc	cgc	acg	gcg	tgg	gtg	432
Lys	Met	Arg	Thr	Val	Leu	Val	Asn	Glu	Lys	Ala	Arg	Thr	Ala	Trp	Val	
	130					135					140					
gac	tcc	ggc	gcg	cag	ctc	ggc	gag	ctc	tac	tac	gcc	atc	gcc	aag	aac	480
Asp	Ser	Gly	Ala	Gln	Leu	Gly	Glu	Leu	Tyr	Tyr	Ala	Ile	Ala	Lys	Asn	
145					150				155						160	
agc	ccc	gtg	ctc	gcg	ttc	cca	gcc	ggc	gtt	tgc	ccg	tcc	att	ggt	gta	528
Ser	Pro	Val	Leu	Ala	Phe	Pro	Ala	Gly	Val	Cys	Pro	Ser	Ile	Gly	Val	
				165				170						175		
ggt	ggc	aac	ttc	gct	ggc	ggc	ggc	ttc	ggc	atg	ctg	ctg	cgc	aag	tac	576
Gly	Gly	Asn	Phe	Ala	Gly	Gly	Gly	Phe	Gly	Met	Leu	Leu	Arg	Lys	Tyr	
			180					185					190			
ggc	atc	gcc	gcc	gag	aac	gtc	atc	gac	gtc	aag	ctg	gtc	gac	gcc	aac	624
Gly	Ile	Ala	Ala	Glu	Asn	Val	Ile	Asp	Val	Lys	Leu	Val	Asp	Ala	Asn	
		195				200						205				
ggc	aag	ctg	ctc	gac	aag	agc	tcc	atg	agc	ccg	gac	cac	ttc	tgg	gcc	672
Gly	Lys	Leu	Leu	Asp	Lys	Ser	Ser	Met	Ser	Pro	Asp	His	Phe	Trp	Ala	
	210					215					220					
gtc	agg	ggc	ggc	ggc	gga	gag	agc	ttc	ggc	atc	gtc	gtc	tcg	tgg	cag	720
Val	Arg	Gly	Gly	Gly	Gly	Glu	Ser	Phe	Gly	Ile	Val	Val	Ser	Trp	Gln	
225					230				235						240	
gtg	aag	ctt	ctc	ccg	gtg	cct	ccc	acc	gtg	act	gtg	ttt	cag	atc	ccc	768
Val	Lys	Leu	Leu	Pro	Val	Pro	Pro	Thr	Val	Thr	Val	Phe	Gln	Ile	Pro	
				245				250						255		
aag	aca	gtg	caa	gaa	ggc	gcc	gta	gac	ctc	atc	aac	aag	tgg	cag	ctg	816
Lys	Thr	Val	Gln	Glu	Gly	Ala	Val	Asp	Leu	Ile	Asn	Lys	Trp	Gln	Leu	
			260				265						270			
gtc	gcg	ccg	gcc	ctt	ccc	ggc	gac	atc	atg	atc	cgc	atc	atc	gcc	atg	864
Val	Ala	Pro	Ala	Leu	Pro	Gly	Asp	Ile	Met	Ile	Arg	Ile	Ile	Ala	Met	
		275					280					285				

ggg gac aaa gcg acg ttc gag gcc atg tac ctg ggc acc tgc aaa acc Gly Asp Lys Ala Thr Phe Glu Ala Met Tyr Leu Gly Thr Cys Lys Thr 290 295 300	912
ctg acg ccg ctg atg agc agc aaa ttc ccg gag ctt ggc atg aac ccc Leu Thr Pro Leu Met Ser Ser Lys Phe Pro Glu Leu Gly Met Asn Pro 305 310 315 320	960
tcg cac tgc aac gag atg ccc tgg atc aag tcc atc ccc ttc atc cac Ser His Cys Asn Glu Met Pro Trp Ile Lys Ser Ile Pro Phe Ile His 325 330 335	1008
ctt ggc aag cag gcc acc ctg gcc gac ctc ctc aac cgg aac aac acc Leu Gly Lys Gln Ala Thr Leu Ala Asp Leu Leu Asn Arg Asn Asn Thr 340 345 350	1056
ttc aaa ccc ttc gcc gaa tac aag tcg gac tac gtc tac cag ccc gtc Phe Lys Pro Phe Ala Glu Tyr Lys Ser Asp Tyr Val Tyr Gln Pro Val 355 360 365	1104
ccc aag ccc gtg tgg gag cag ctc ttc ggc tgg ctc acg aaa ccc ggc Pro Lys Pro Val Trp Glu Gln Leu Phe Gly Trp Leu Thr Lys Pro Gly 370 375 380	1152
gcg ggg atc atg gtc atg gac cca tac ggc gcc acc atc agc gcc acc Ala Gly Ile Met Val Met Asp Pro Tyr Gly Ala Thr Ile Ser Ala Thr 385 390 395 400	1200
ccc gaa gcg gcg acg ccg ttc cct cac cgc aag ggc gtc ctc ttc aac Pro Glu Ala Ala Thr Pro Phe Pro His Arg Lys Gly Val Leu Phe Asn 405 410 415	1248
atc cag tac gtc aac tac tgg ttc gcc gag gca gcc ggc gcc gcg ccg Ile Gln Tyr Val Asn Tyr Trp Phe Ala Glu Ala Ala Gly Ala Ala Pro 420 425 430	1296
ctg cag tgg agc aag gac att tac aaa ttc atg gag ccg ttc gtg agc Leu Gln Trp Ser Lys Asp Ile Tyr Lys Phe Met Glu Pro Phe Val Ser 435 440 445	1344
aag aac ccc agg cag gcg tac gcc aac tac agg gac atc gac ctc ggc Lys Asn Pro Arg Gln Ala Tyr Ala Asn Tyr Arg Asp Ile Asp Leu Gly 450 455 460	1392
agg aac gag gtg gtg aac gac atc tca acc tac agc agc ggc aag gtg Arg Asn Glu Val Val Asn Asp Ile Ser Thr Tyr Ser Ser Gly Lys Val 465 470 475 480	1440
tgg ggc gag aag tac ttc aag ggc aac ttc caa agg ctc gcc atc acc Trp Gly Glu Lys Tyr Phe Lys Gly Asn Phe Gln Arg Leu Ala Ile Thr 485 490 495	1488
aag ggc aag gtg gat ccc cag gac tac ttc agg aac gag cag agc atc Lys Gly Lys Val Asp Pro Gln Asp Tyr Phe Arg Asn Glu Gln Ser Ile 500 505 510	1536
ccg ccg ctg ctg ggc aag tag tgaccgagag tcttgcatgg agattttag Pro Pro Leu Leu Gly Lys 515	1587
tgcgtgcttg gcgtttctga t	1608

<210> 6

<211> 518

<212> PRT

<213> Hordeum vulgare

<400> 6

Ser Ser Arg Ala Phe Ala Leu Val Leu Leu Leu Cys Ala Leu Ser Cys
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His His Ala Ala Val Ser Ser Ala Gln Val Pro Ala Lys Asp Asp Phe
20 25 30

Leu Gly Cys Leu Val Lys Glu Ile Pro Ala Arg Leu Leu Phe Ala Lys
35 40 45

Ser Ser Pro Ala Phe Pro Ala Val Leu Glu Gln Thr Ile Arg Asn Ser
50 55 60

Arg Trp Ser Ser Pro Gln Asn Val Lys Pro Leu Tyr Ile Ile Thr Pro
65 70 75 80

Thr Asn Thr Ser His Ile Gln Ser Ala Val Val Cys Gly Arg Arg His
85 90 95

Gly Val Arg Leu Arg Val Arg Ser Gly Gly His Asp Tyr Glu Gly Leu
100 105 110

Ser Tyr Arg Ser Glu Arg Pro Glu Ala Phe Ala Val Val Asp Leu Asn
115 120 125

Lys Met Arg Thr Val Leu Val Asn Glu Lys Ala Arg Thr Ala Trp Val
130 135 140

Asp Ser Gly Ala Gln Leu Gly Glu Leu Tyr Tyr Ala Ile Ala Lys Asn
145 150 155 160

Ser Pro Val Leu Ala Phe Pro Ala Gly Val Cys Pro Ser Ile Gly Val
165 170 175

Gly Gly Asn Phe Ala Gly Gly Gly Phe Gly Met Leu Leu Arg Lys Tyr
180 185 190

Gly Ile Ala Ala Glu Asn Val Ile Asp Val Lys Leu Val Asp Ala Asn
195 200 205

Gly Lys Leu Leu Asp Lys Ser Ser Met Ser Pro Asp His Phe Trp Ala
 210 215 220
 Val Arg Gly Gly Gly Gly Glu Ser Phe Gly Ile Val Val Ser Trp Gln
 225 230 235 240
 Val Lys Leu Leu Pro Val Pro Pro Thr Val Thr Val Phe Gln Ile Pro
 245 250 255
 Lys Thr Val Gln Glu Gly Ala Val Asp Leu Ile Asn Lys Trp Gln Leu
 260 265 270
 Val Ala Pro Ala Leu Pro Gly Asp Ile Met Ile Arg Ile Ile Ala Met
 275 280 285
 Gly Asp Lys Ala Thr Phe Glu Ala Met Tyr Leu Gly Thr Cys Lys Thr
 290 295 300
 Leu Thr Pro Leu Met Ser Ser Lys Phe Pro Glu Leu Gly Met Asn Pro
 305 310 315 320
 Ser His Cys Asn Glu Met Pro Trp Ile Lys Ser Ile Pro Phe Ile His
 325 330 335
 Leu Gly Lys Gln Ala Thr Leu Ala Asp Leu Leu Asn Arg Asn Asn Thr
 340 345 350
 Phe Lys Pro Phe Ala Glu Tyr Lys Ser Asp Tyr Val Tyr Gln Pro Val
 355 360 365
 Pro Lys Pro Val Trp Glu Gln Leu Phe Gly Trp Leu Thr Lys Pro Gly
 370 375 380
 Ala Gly Ile Met Val Met Asp Pro Tyr Gly Ala Thr Ile Ser Ala Thr
 385 390 395 400
 Pro Glu Ala Ala Thr Pro Phe Pro His Arg Lys Gly Val Leu Phe Asn
 405 410 415
 Ile Gln Tyr Val Asn Tyr Trp Phe Ala Glu Ala Ala Gly Ala Ala Pro
 420 425 430
 Leu Gln Trp Ser Lys Asp Ile Tyr Lys Phe Met Glu Pro Phe Val Ser
 435 440 445
 Lys Asn Pro Arg Gln Ala Tyr Ala Asn Tyr Arg Asp Ile Asp Leu Gly
 450 455 460

Arg Asn Glu Val Val Asn Asp Ile Ser Thr Tyr Ser Ser Gly Lys Val
465 470 475 480

Trp Gly Glu Lys Tyr Phe Lys Gly Asn Phe Gln Arg Leu Ala Ile Thr
485 490 495

Lys Gly Lys Val Asp Pro Gln Asp Tyr Phe Arg Asn Glu Gln Ser Ile
500 505 510

Pro Pro Leu Leu Gly Lys
515

<210> 7

<211> 1603

<212> DNA

<213> Triticum aestivum

<220>

<221> stop_codon

<222> (1555)..(1557)

<223>

<220>

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<222> (1)..(63)

<223>

<220>

<221> signal_sequence_PROT

<222> (1)..(21)

<223>

<220>

<221> CDS

<222> (1) .. (1557)

<223>

<400> 7

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Asn	Tyr	Arg	Ala	Phe	Thr	Leu	Val	Leu	Leu	Phe	Cys	Ala	Leu	Ser	Cys	
1				5				10					15			
caa	gcc	gcc	gcc	acc	tac	gcg	ccg	gtg	cct	gcc	aag	gag	gac	ttc	ctc	96
Gln	Ala	Ala	Ala	Thr	Tyr	Ala	Pro	Val	Pro	Ala	Lys	Glu	Asp	Phe	Leu	
			20					25					30			
gga	tgc	ctc	atg	aag	gag	ata	ccg	gca	cg	ctc	ctc	tac	gcc	aag	agc	144
Gly	Cys	Leu	Met	Lys	Glu	Ile	Pro	Ala	Arg	Leu	Leu	Tyr	Ala	Lys	Ser	
		35					40					45				
tcg	cct	gac	ttc	ccc	acc	gtc	ctg	gcg	cag	acc	atc	agg	aac	tcg	cgg	192
Ser	Pro	Asp	Phe	Pro	Thr	Val	Leu	Ala	Gln	Thr	Ile	Arg	Asn	Ser	Arg	
	50					55					60					
tgg	ttg	tcg	ccg	cag	aac	gtg	aag	ccg	ctc	tac	atc	atc	acc	ccc	acc	240
Trp	Leu	Ser	Pro	Gln	Asn	Val	Lys	Pro	Leu	Tyr	Ile	Ile	Thr	Pro	Thr	
65				70						75					80	
aac	gcc	tcg	cac	atc	cag	tcc	gcg	gtg	gtg	tgc	gga	cg	cgg	cac	agc	288
Asn	Ala	Ser	His	Ile	Gln	Ser	Ala	Val	Val	Cys	Gly	Arg	Arg	His	Ser	
				85				90						95		
gtc	cg	ctc	cg	gtc	cg	agc	ggc	ggc	cac	gac	tac	gag	ggc	ctg	tcg	336
Val	Arg	Leu	Arg	Val	Arg	Ser	Gly	Gly	His	Asp	Tyr	Glu	Gly	Leu	Ser	
			100					105					110			
tac	cgg	tcc	gag	aaa	ccc	gag	acg	ttc	gcc	gtc	gtc	gac	ctc	aac	aag	384
Tyr	Arg	Ser	Glu	Lys	Pro	Glu	Thr	Phe	Ala	Val	Val	Asp	Leu	Asn	Lys	
		115					120					125				
atg	cgg	gca	gtg	ttg	atc	gac	ggc	tac	gcc	cg	acg	gcg	tgg	gtc	gaa	432
Met	Arg	Ala	Val	Leu	Ile	Asp	Gly	Tyr	Ala	Arg	Thr	Ala	Trp	Val	Glu	
	130					135					140					
tcc	ggc	gcg	cag	ctc	ggc	gag	ctc	tac	tac	gcc	atc	gcg	aaa	aac	agc	480
Ser	Gly	Ala	Gln	Leu	Gly	Glu	Leu	Tyr	Tyr	Ala	Ile	Ala	Lys	Asn	Ser	
145					150					155					160	
ccc	gtg	ctc	gcg	ttc	ccg	gcc	ggc	gtc	tgc	ccg	acc	atc	ggc	gtc	ggc	528
Pro	Val	Leu	Ala	Phe	Pro	Ala	Gly	Val	Cys	Pro	Thr	Ile	Gly	Val	Gly	
				165					170					175		
ggc	aac	ttc	gca	ggc	ggc	ggc	ttt	ggc	atg	ctg	ctg	cgg	aag	tac	ggc	576
Gly	Asn	Phe	Ala	Gly	Gly	Gly	Phe	Gly	Met	Leu	Leu	Arg	Lys	Tyr	Gly	
			180					185					190			
atc	gcc	gcc	gag	aac	gtc	atc	gac	gtc	aag	gtg	gtc	gac	ccc	aac	ggc	624
Ile	Ala	Ala	Glu	Asn	Val	Ile	Asp	Val	Lys	Val	Val	Asp	Pro	Asn	Gly	
		195					200					205				
aag	ctt	ctc	gac	aag	agc	tcc	atg	agc	ccg	gac	cac	ttc	tgg	gcc	gtc	672
Lys	Leu	Leu	Asp	Lys	Ser	Ser	Met	Ser	Pro	Asp	His	Phe	Trp	Ala	Val	
	210					215					220					

agg ggc ggc ggc gga gag agc ttt ggc atc gtc gtg tcg tgg caa gtg Arg Gly Gly Gly Gly Glu Ser Phe Gly Ile Val Val Ser Trp Gln Val 225 230 235 240	720
aag ctc ctg ccg gtg cct ccc acc gtg acc gtg ttc aag atc ccc aag Lys Leu Leu Pro Val Pro Pro Thr Val Thr Val Phe Lys Ile Pro Lys 245 250 255	768
aca gtg caa gaa ggc gcc gta gac ctc gtc aac aag tgg caa ctg gtc Thr Val Gln Glu Gly Ala Val Asp Leu Val Asn Lys Trp Gln Leu Val 260 265 270	816
ggg ccg gcc ctt ccc ggc gac ctc atg atc cgc gtc atc gct gcg ggg Gly Pro Ala Leu Pro Gly Asp Leu Met Ile Arg Val Ile Ala Ala Gly 275 280 285	864
aac acc gcg aca ttc gag ggc atg tac ctg ggc acc tgc caa acc ctg Asn Thr Ala Thr Phe Glu Gly Met Tyr Leu Gly Thr Cys Gln Thr Leu 290 295 300	912
acg ccg ttg atg agc agc caa ttc ccc gag ctt ggc atg aac ccc tat Thr Pro Leu Met Ser Ser Gln Phe Pro Glu Leu Gly Met Asn Pro Tyr 305 310 315 320	960
cac tgc aac gag atg ccc tgg atc aag tcc atc ccc ttc atc cac ctc His Cys Asn Glu Met Pro Trp Ile Lys Ser Ile Pro Phe Ile His Leu 325 330 335	1008
ggc aaa gag gcc agc ctg gtc gac ctc ctc aac cgg aac aac acc ttc Gly Lys Glu Ala Ser Leu Val Asp Leu Leu Asn Arg Asn Asn Thr Phe 340 345 350	1056
aag ccc ttc gcc gaa tac aag tcg gac tac gtg tac cag ccc ttc ccc Lys Pro Phe Ala Glu Tyr Lys Ser Asp Tyr Val Tyr Gln Pro Phe Pro 355 360 365	1104
aag ccc gtg tgg gag cag atc ttc ggc tgg ctc acg aag ccc ggt ggg Lys Pro Val Trp Glu Gln Ile Phe Gly Trp Leu Thr Lys Pro Gly Gly 370 375 380	1152
ggg atg atg atc atg gac cca tac ggc gcc acc atc agc gcc acc ccc Gly Met Met Ile Met Asp Pro Tyr Gly Ala Thr Ile Ser Ala Thr Pro 385 390 395 400	1200
gaa gcg gcg acg ccg ttc cct cac cgc cag ggc gtt ctc ttc aac atc Glu Ala Ala Thr Pro Phe Pro His Arg Gln Gly Val Leu Phe Asn Ile 405 410 415	1248
cag tac gtc aac tac tgg ttc gcc gag gca gcc gcc gcc gcg ccg ctg Gln Tyr Val Asn Tyr Trp Phe Ala Glu Ala Ala Ala Ala Pro Leu 420 425 430	1296
cag tgg agc aag gac atg tac aat ttc atg gag ccg tac gtg agc aag Gln Trp Ser Lys Asp Met Tyr Asn Phe Met Glu Pro Tyr Val Ser Lys 435 440 445	1344
aac ccc agg cag gcg tac gcc aac tac agg gac att gac ctc ggc agg Asn Pro Arg Gln Ala Tyr Ala Asn Tyr Arg Asp Ile Asp Leu Gly Arg 450 455 460	1392
aac gag gtg gtg aac gac atc tca acc tat agc agc ggc aag gtt tgg Asn Glu Val Val Asn Asp Ile Ser Thr Tyr Ser Ser Gly Lys Val Trp 465 470 475 480	1440

- 20 -

ggc gag aag tac ttc aag ggc aac ttc caa agg ctc gct att acc aag 1488
 Gly Glu Lys Tyr Phe Lys Gly Asn Phe Gln Arg Leu Ala Ile Thr Lys
 485 490 495

ggc aag gtg gat cct cag gac tac ttc agg aac gag cag agc atc ccg 1536
 Gly Lys Val Asp Pro Gln Asp Tyr Phe Arg Asn Glu Gln Ser Ile Pro
 500 505 510

ccg ctg ctc gag aag tac tga tcgaggacct tgcattggaga tttagtgcgt 1587
 Pro Leu Leu Glu Lys Tyr
 515

ggttgccggtt tcacat 1603

<210> 8

<211> 518

<212> PRT

<213> Triticum aestivum

<400> 8

Asn Tyr Arg Ala Phe Thr Leu Val Leu Leu Phe Cys Ala Leu Ser Cys
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Gln Ala Ala Ala Thr Tyr Ala Pro Val Pro Ala Lys Glu Asp Phe Leu
 20 25 30

Gly Cys Leu Met Lys Glu Ile Pro Ala Arg Leu Leu Tyr Ala Lys Ser
 35 40 45

Ser Pro Asp Phe Pro Thr Val Leu Ala Gln Thr Ile Arg Asn Ser Arg
 50 55 60

Trp Leu Ser Pro Gln Asn Val Lys Pro Leu Tyr Ile Ile Thr Pro Thr
 65 70 75 80

Asn Ala Ser His Ile Gln Ser Ala Val Val Cys Gly Arg Arg His Ser
 85 90 95

Val Arg Leu Arg Val Arg Ser Gly Gly His Asp Tyr Glu Gly Leu Ser
 100 105 110

Tyr Arg Ser Glu Lys Pro Glu Thr Phe Ala Val Val Asp Leu Asn Lys
 115 120 125

Met Arg Ala Val Leu Ile Asp Gly Tyr Ala Arg Thr Ala Trp Val Glu
 130 135 140

Ser Gly Ala Gln Leu Gly Glu Leu Tyr Tyr Ala Ile Ala Lys Asn Ser
 145 150 155 160

Pro Val Leu Ala Phe Pro Ala Gly Val Cys Pro Thr Ile Gly Val Gly
 165 170 175

Gly Asn Phe Ala Gly Gly Gly Phe Gly Met Leu Leu Arg Lys Tyr Gly
 180 185 190

Ile Ala Ala Glu Asn Val Ile Asp Val Lys Val Val Asp Pro Asn Gly
 195 200 205

Lys Leu Leu Asp Lys Ser Ser Met Ser Pro Asp His Phe Trp Ala Val
 210 215 220

Arg Gly Gly Gly Gly Glu Ser Phe Gly Ile Val Val Ser Trp Gln Val
 225 230 235 240

Lys Leu Leu Pro Val Pro Pro Thr Val Thr Val Phe Lys Ile Pro Lys
 245 250 255

Thr Val Gln Glu Gly Ala Val Asp Leu Val Asn Lys Trp Gln Leu Val
 260 265 270

Gly Pro Ala Leu Pro Gly Asp Leu Met Ile Arg Val Ile Ala Ala Gly
 275 280 285

Asn Thr Ala Thr Phe Glu Gly Met Tyr Leu Gly Thr Cys Gln Thr Leu
 290 295 300

Thr Pro Leu Met Ser Ser Gln Phe Pro Glu Leu Gly Met Asn Pro Tyr
 305 310 315 320

His Cys Asn Glu Met Pro Trp Ile Lys Ser Ile Pro Phe Ile His Leu
 325 330 335

Gly Lys Glu Ala Ser Leu Val Asp Leu Leu Asn Arg Asn Asn Thr Phe
 340 345 350

Lys Pro Phe Ala Glu Tyr Lys Ser Asp Tyr Val Tyr Gln Pro Phe Pro
 355 360 365

Lys Pro Val Trp Glu Gln Ile Phe Gly Trp Leu Thr Lys Pro Gly Gly
 370 375 380

Gly Met Met Ile Met Asp Pro Tyr Gly Ala Thr Ile Ser Ala Thr Pro
 385 390 395 400

Glu Ala Ala Thr Pro Phe Pro His Arg Gln Gly Val Leu Phe Asn Ile
405 410 415

Gln Tyr Val Asn Tyr Trp Phe Ala Glu Ala Ala Ala Ala Ala Pro Leu
420 425 430

Gln Trp Ser Lys Asp Met Tyr Asn Phe Met Glu Pro Tyr Val Ser Lys
435 440 445

Asn Pro Arg Gln Ala Tyr Ala Asn Tyr Arg Asp Ile Asp Leu Gly Arg
450 455 460

Asn Glu Val Val Asn Asp Ile Ser Thr Tyr Ser Ser Gly Lys Val Trp
465 470 475 480

Gly Glu Lys Tyr Phe Lys Gly Asn Phe Gln Arg Leu Ala Ile Thr Lys
485 490 495

Gly Lys Val Asp Pro Gln Asp Tyr Phe Arg Asn Glu Gln Ser Ile Pro
500 505 510

Pro Leu Leu Glu Lys Tyr
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<210> 9

<211> 1603

<212> DNA

<213> Triticum aestivum

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<222> (1555)..(1557)

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<222> (1)..(1557)

<223>

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<222> (1)..(63)

<223>

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<221> signal_sequence_PROT

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<223>

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Asn	Cys	Arg	Ala	Phe	Ala	Gln	Val	Leu	Leu	Phe	Phe	Ala	Leu	Ser	Cys	
1				5				10					15			

caa	gcc	gcc	gcc	acc	tac	gcg	ccg	gtg	cct	gcc	aag	gag	gac	ttc	ctc	96
Gln	Ala	Ala	Ala	Thr	Tyr	Ala	Pro	Val	Pro	Ala	Lys	Glu	Asp	Phe	Leu	
			20					25					30			

gga	tgc	ctc	atg	aag	gag	ata	ccg	gcc	cgc	ctc	ctc	tac	gcc	aag	agc	144
Gly	Cys	Leu	Met	Lys	Glu	Ile	Pro	Ala	Arg	Leu	Leu	Tyr	Ala	Lys	Ser	
		35					40					45				

tcg	cct	gac	tac	ccc	acc	gtg	ctg	gcg	cag	acc	atc	agg	aac	tcg	cgg	192
Ser	Pro	Asp	Tyr	Pro	Thr	Val	Leu	Ala	Gln	Thr	Ile	Arg	Asn	Ser	Arg	
	50					55					60					

tgg	tcg	acg	cag	cag	aac	gtg	aag	ccg	ctg	tac	atc	atc	acc	ccc	acc	240
Trp	Ser	Thr	Gln	Gln	Asn	Val	Lys	Pro	Leu	Tyr	Ile	Ile	Thr	Pro	Thr	
65					70					75					80	

aac	gcc	tcc	cac	atc	caa	tcc	gcg	gtg	gtg	tgc	ggc	cgc	cgg	cac	ggc	288
Asn	Ala	Ser	His	Ile	Gln	Ser	Ala	Val	Val	Cys	Gly	Arg	Arg	His	Gly	
				85					90					95		

gtc	cgc	ctc	cgc	gtg	cgg	agc	ggc	ggc	cac	gac	tac	gag	ggc	ctg	tcg	336
Val	Arg	Leu	Arg	Val	Arg	Ser	Gly	Gly	His	Asp	Tyr	Glu	Gly	Leu	Ser	
			100					105					110			

tac	cgg	tcc	gag	aaa	ccc	gag	acg	ttc	gcc	gtc	gtc	gac	ctc	aac	aag	384
Tyr	Arg	Ser	Glu	Lys	Pro	Glu	Thr	Phe	Ala	Val	Val	Asp	Leu	Asn	Lys	
		115					120					125				

atg	cgg	gca	gtg	gtt	gtc	gac	ggc	tac	gcc	cgc	acg	gcg	tgg	gtc	gaa	432
Met	Arg	Ala	Val	Val	Val	Asp	Gly	Tyr	Ala	Arg	Thr	Ala	Trp	Val	Glu	
		130				135					140					

tcc	ggc	gcg	cag	ctc	ggc	gag	ctc	tac	tac	gcc	atc	gcg	aag	aac	agc	480
Ser	Gly	Ala	Gln	Leu	Gly	Glu	Leu	Tyr	Tyr	Ala	Ile	Ala	Lys	Asn	Ser	
145					150					155					160	

ccc	gtg	ctc	gcg	ttc	ccg	gcc	ggc	gtc	tgc	ccg	tcc	atc	ggc	gtc	ggc	528
Pro	Val	Leu	Ala	Phe	Pro	Ala	Gly	Val	Cys	Pro	Ser	Ile	Gly	Val	Gly	
			165						170						175	
ggc	aac	ttc	gca	ggc	ggc	ggc	ttc	ggc	atg	ctg	ctg	cgc	aag	tac	ggc	576
Gly	Asn	Phe	Ala	Gly	Gly	Gly	Phe	Gly	Met	Leu	Leu	Arg	Lys	Tyr	Gly	
			180					185					190			
atc	gcc	gcc	gag	aac	gtc	atc	gac	gtc	aag	gtg	gtc	gac	ccc	gac	ggc	624
Ile	Ala	Ala	Glu	Asn	Val	Ile	Asp	Val	Lys	Val	Val	Asp	Pro	Asp	Gly	
			195				200					205				
aag	ctg	ctc	gac	aag	agc	tcc	atg	agc	gcg	gac	cac	ttc	tgg	gcc	gtc	672
Lys	Leu	Leu	Asp	Lys	Ser	Ser	Met	Ser	Ala	Asp	His	Phe	Trp	Ala	Val	
	210					215					220					
agg	ggc	ggc	ggc	gga	gag	agc	ttc	ggc	atc	gtc	gtc	tcg	tgg	cag	gtg	720
Arg	Gly	Gly	Gly	Gly	Glu	Ser	Phe	Gly	Ile	Val	Val	Ser	Trp	Gln	Val	
225					230					235					240	
aag	ctc	atg	cca	gtg	cct	ccc	acc	gtc	acc	gtg	ttt	aag	atc	ccc	aag	768
Lys	Leu	Met	Pro	Val	Pro	Pro	Thr	Val	Thr	Val	Phe	Lys	Ile	Pro	Lys	
				245					250					255		
acg	gtg	caa	gaa	ggc	gcc	gta	gac	ctc	gtc	aac	aag	tgg	cag	ctg	gtc	816
Thr	Val	Gln	Glu	Gly	Ala	Val	Asp	Leu	Val	Asn	Lys	Trp	Gln	Leu	Val	
			260					265					270			
ggg	ccg	gca	ctt	ccc	ggc	gac	ctc	atg	atc	cgc	gtc	atc	gct	gcc	ggg	864
Gly	Pro	Ala	Leu	Pro	Gly	Asp	Leu	Met	Ile	Arg	Val	Ile	Ala	Ala	Gly	
		275					280					285				
aac	acg	gcg	acg	ttc	gag	gcc	ttg	tac	ctg	ggc	acc	tgc	aaa	acc	ctg	912
Asn	Thr	Ala	Thr	Phe	Glu	Ala	Leu	Tyr	Leu	Gly	Thr	Cys	Lys	Thr	Leu	
	290					295					300					
acg	ccg	ctg	atg	agc	agc	caa	ttc	ccc	gag	ctt	ggc	atg	aac	ccc	tat	960
Thr	Pro	Leu	Met	Ser	Ser	Gln	Phe	Pro	Glu	Leu	Gly	Met	Asn	Pro	Tyr	
305					310					315					320	
cac	tgc	aac	gag	atg	ccc	tgg	atc	aag	tcc	gtc	ccc	ttc	atc	cac	ctc	1008
His	Cys	Asn	Glu	Met	Pro	Trp	Ile	Lys	Ser	Val	Pro	Phe	Ile	His	Leu	
				325				330						335		
ggc	aaa	cag	gct	ggc	ctg	gac	gac	ctc	ctc	aac	cgg	aac	aac	acc	ttc	1056
Gly	Lys	Gln	Ala	Gly	Leu	Asp	Asp	Leu	Leu	Asn	Arg	Asn	Asn	Thr	Phe	
			340					345					350			
aag	ccc	ttc	gcc	gaa	tac	aag	tcg	gac	tac	gtg	tac	cag	ccc	ttc	ccc	1104
Lys	Pro	Phe	Ala	Glu	Tyr	Lys	Ser	Asp	Tyr	Val	Tyr	Gln	Pro	Phe	Pro	
		355					360					365				
aag	ccc	gtg	tgg	gag	cag	atc	ttc	ggc	tgg	ctc	gcg	aag	ccc	ggc	gcg	1152
Lys	Pro	Val	Trp	Glu	Gln	Ile	Phe	Gly	Trp	Leu	Ala	Lys	Pro	Gly	Ala	
	370					375					380					
ggg	atc	atg	atc	atg	gac	ccc	tac	ggc	gcc	acc	atc	agc	gcc	acc	ccc	1200
Gly	Ile	Met	Ile	Met	Asp	Pro	Tyr	Gly	Ala	Thr	Ile	Ser	Ala	Thr	Pro	
385					390					395					400	
gaa	gcg	gcg	acg	ccg	ttc	cct	cac	cgc	cag	ggc	gtc	ctc	ttc	aac	atc	1248
Glu	Ala	Ala	Thr	Pro	Phe	Pro	His	Arg	Gln	Gly	Val	Leu	Phe	Asn	Ile	
				405					410					415		

cag tat gtc aac tac tgg ttc gcc gag cca gcc ggc gcc gcg ccg ctg 1296
 Gln Tyr Val Asn Tyr Trp Phe Ala Glu Pro Ala Gly Ala Ala Pro Leu
 420 425 430

cag tgg agc aag gac att tac aat ttc atg gag ccg tac gtg agc aag 1344
 Gln Trp Ser Lys Asp Ile Tyr Asn Phe Met Glu Pro Tyr Val Ser Lys
 435 440 445

aac ccc agg cag gcg tac gcc aac tac agg gac atc gac ctc ggc agg 1392
 Asn Pro Arg Gln Ala Tyr Ala Asn Tyr Arg Asp Ile Asp Leu Gly Arg
 450 455 460

aat gag gtg gtg aac gac atc tca acc tac agc agc ggc aag gtg tgg 1440
 Asn Glu Val Val Asn Asp Ile Ser Thr Tyr Ser Ser Gly Lys Val Trp
 465 470 475 480

ggc gag aag tac ttc aag agc aac ttc caa agg ctc gcc att acc aag 1488
 Gly Glu Lys Tyr Phe Lys Ser Asn Phe Gln Arg Leu Ala Ile Thr Lys
 485 490 495

ggc aag gta gat cct cag gac tac ttc agg aat gag caa agc atc ccg 1536
 Gly Lys Val Asp Pro Gln Asp Tyr Phe Arg Asn Glu Gln Ser Ile Pro
 500 505 510

ccg ctg atc gag aag tac tga tcgaggacct tgcattggaga tttagtgcgt 1587
 Pro Leu Ile Glu Lys Tyr
 515

ggttggcggtt tcacat 1603

<210> 10

<211> 518

<212> PRT

<213> Triticum aestivum

<400> 10

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Gln Ala Ala Ala Thr Tyr Ala Pro Val Pro Ala Lys Glu Asp Phe Leu
 20 25 30

Gly Cys Leu Met Lys Glu Ile Pro Ala Arg Leu Leu Tyr Ala Lys Ser
 35 40 45

Ser Pro Asp Tyr Pro Thr Val Leu Ala Gln Thr Ile Arg Asn Ser Arg
 50 55 60

Trp Ser Thr Gln Gln Asn Val Lys Pro Leu Tyr Ile Ile Thr Pro Thr
 65 70 75 80

Asn Ala Ser His Ile Gln Ser Ala Val Val Cys Gly Arg Arg His Gly
 85 90 95

Val Arg Leu Arg Val Arg Ser Gly Gly His Asp Tyr Glu Gly Leu Ser
 100 105 110

Tyr Arg Ser Glu Lys Pro Glu Thr Phe Ala Val Val Asp Leu Asn Lys
 115 120 125

Met Arg Ala Val Val Val Asp Gly Tyr Ala Arg Thr Ala Trp Val Glu
 130 135 140

Ser Gly Ala Gln Leu Gly Glu Leu Tyr Tyr Ala Ile Ala Lys Asn Ser
 145 150 155 160

Pro Val Leu Ala Phe Pro Ala Gly Val Cys Pro Ser Ile Gly Val Gly
 165 170 175

Gly Asn Phe Ala Gly Gly Gly Phe Gly Met Leu Leu Arg Lys Tyr Gly
 180 185 190

Ile Ala Ala Glu Asn Val Ile Asp Val Lys Val Val Asp Pro Asp Gly
 195 200 205

Lys Leu Leu Asp Lys Ser Ser Met Ser Ala Asp His Phe Trp Ala Val
 210 215 220

Arg Gly Gly Gly Gly Glu Ser Phe Gly Ile Val Val Ser Trp Gln Val
 225 230 235 240

Lys Leu Met Pro Val Pro Pro Thr Val Thr Val Phe Lys Ile Pro Lys
 245 250 255

Thr Val Gln Glu Gly Ala Val Asp Leu Val Asn Lys Trp Gln Leu Val
 260 265 270

Gly Pro Ala Leu Pro Gly Asp Leu Met Ile Arg Val Ile Ala Ala Gly
 275 280 285

Asn Thr Ala Thr Phe Glu Ala Leu Tyr Leu Gly Thr Cys Lys Thr Leu
 290 295 300

Thr Pro Leu Met Ser Ser Gln Phe Pro Glu Leu Gly Met Asn Pro Tyr
 305 310 315 320

His Cys Asn Glu Met Pro Trp Ile Lys Ser Val Pro Phe Ile His Leu
 325 330 335

Gly Lys Gln Ala Gly Leu Asp Asp Leu Leu Asn Arg Asn Asn Thr Phe
340 345 350

Lys Pro Phe Ala Glu Tyr Lys Ser Asp Tyr Val Tyr Gln Pro Phe Pro
355 360 365

Lys Pro Val Trp Glu Gln Ile Phe Gly Trp Leu Ala Lys Pro Gly Ala
370 375 380

Gly Ile Met Ile Met Asp Pro Tyr Gly Ala Thr Ile Ser Ala Thr Pro
385 390 395 400

Glu Ala Ala Thr Pro Phe Pro His Arg Gln Gly Val Leu Phe Asn Ile
405 410 415

Gln Tyr Val Asn Tyr Trp Phe Ala Glu Pro Ala Gly Ala Ala Pro Leu
420 425 430

Gln Trp Ser Lys Asp Ile Tyr Asn Phe Met Glu Pro Tyr Val Ser Lys
435 440 445

Asn Pro Arg Gln Ala Tyr Ala Asn Tyr Arg Asp Ile Asp Leu Gly Arg
450 455 460

Asn Glu Val Val Asn Asp Ile Ser Thr Tyr Ser Ser Gly Lys Val Trp
465 470 475 480

Gly Glu Lys Tyr Phe Lys Ser Asn Phe Gln Arg Leu Ala Ile Thr Lys
485 490 495

Gly Lys Val Asp Pro Gln Asp Tyr Phe Arg Asn Glu Gln Ser Ile Pro
500 505 510

Pro Leu Ile Glu Lys Tyr
515

<210> 11

<211> 1503

<212> DNA

<213> Phleum pratense

<220>

<221> CDS

<222> (1) .. (1503)

<223>

<400> 11

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Tyr Phe Pro Pro Pro Ala Ala Lys Glu Asp Phe Leu Gly Cys Leu Val	
1 5 10 15	
aaa gaa atc ccg ccg cgt ctg ttg tac gcg aaa tcg tcg ccg gcg tat	96
Lys Glu Ile Pro Pro Arg Leu Leu Tyr Ala Lys Ser Ser Pro Ala Tyr	
20 25 30	
ccc tca gtc ctg ggg cag acc atc cgg aac tcg agg tgg tcg tcg ccg	144
Pro Ser Val Leu Gly Gln Thr Ile Arg Asn Ser Arg Trp Ser Ser Pro	
35 40 45	
gac aac gtg aag ccg ctc tac atc atc acc ccc acc aac gtc tcc cac	192
Asp Asn Val Lys Pro Leu Tyr Ile Ile Thr Pro Thr Asn Val Ser His	
50 55 60	
atc cag tcc gcc gtg gtg tgc ggc cgc cgc cac agc gtc cgc atc cgc	240
Ile Gln Ser Ala Val Val Cys Gly Arg Arg His Ser Val Arg Ile Arg	
65 70 75 80	
gtg cgc agc ggc ggg cac gac tac gag ggc ctc tcg tac cgg tct ttg	288
Val Arg Ser Gly Gly His Asp Tyr Glu Gly Leu Ser Tyr Arg Ser Leu	
85 90 95	
cag ccc gag acg ttc gcc gtc gtc gac ctc aac aag atg cgg gcg gtg	336
Gln Pro Glu Thr Phe Ala Val Val Asp Leu Asn Lys Met Arg Ala Val	
100 105 110	
tgg gtg gac ggc aag gcc cgc acg gcg tgg gtg gac tcc ggc gcg cag	384
Trp Val Asp Gly Lys Ala Arg Thr Ala Trp Val Asp Ser Gly Ala Gln	
115 120 125	
ctc ggc gag ctc tac tac gcc atc tat aag gcg agc ccc acg ctg gcg	432
Leu Gly Glu Leu Tyr Tyr Ala Ile Tyr Lys Ala Ser Pro Thr Leu Ala	
130 135 140	
ttc ccg gcc ggc gtg tgc ccg acg atc gga gtg ggc ggc aac ttc gcg	480
Phe Pro Ala Gly Val Cys Pro Thr Ile Gly Val Gly Gly Asn Phe Ala	
145 150 155 160	
ggc ggc ggc ttc ggc atg ctg ctg cgc aag tac ggc atc gcc gcg gag	528
Gly Gly Gly Phe Gly Met Leu Leu Arg Lys Tyr Gly Ile Ala Ala Glu	
165 170 175	
aac gtc atc gac gtg aag ctc gtc gac gcc aac ggc aag ctg cac gac	576
Asn Val Ile Asp Val Lys Leu Val Asp Ala Asn Gly Lys Leu His Asp	
180 185 190	
aag aag tcc atg ggc gac gac cat ttc tgg gcc gtc agg ggc ggc ggg	624
Lys Lys Ser Met Gly Asp Asp His Phe Trp Ala Val Arg Gly Gly Gly	
195 200 205	
ggc gag agc ttc ggc atc gtg gtc gcg tgg cag gtg aag ctc ctg ccg	672
Gly Glu Ser Phe Gly Ile Val Val Ala Trp Gln Val Lys Leu Leu Pro	

210	215	220	
gtg ccg ccc acc gtg aca ata ttc aag atc tcc aag aca gtg agc gag Val Pro Pro Thr Val Thr Ile Phe Lys Ile Ser Lys Thr Val Ser Glu 225 230 235 240			720
ggc gcc gtg gac atc atc aac aag tgg caa gtg gtc gcg ccg cag ctt Gly Ala Val Asp Ile Ile Asn Lys Trp Gln Val Val Ala Pro Gln Leu 245 250 255			768
ccc gcc gac ctc atg atc cgc atc atc gcg cag ggg ccc aag gcc acg Pro Ala Asp Leu Met Ile Arg Ile Ile Ala Gln Gly Pro Lys Ala Thr 260 265 270			816
ttc gag gcc atg tac ctc ggc acc tgc aaa acc ctg acg ccg ttg atg Phe Glu Ala Met Tyr Leu Gly Thr Cys Lys Thr Leu Thr Pro Leu Met 275 280 285			864
agc agc aag ttc ccg gag ctc ggc atg aac ccc tcc cac tgc aac gag Ser Ser Lys Phe Pro Glu Leu Gly Met Asn Pro Ser His Cys Asn Glu 290 295 300			912
atg tca tgg atc cag tcc atc ccc ttc gtc cac ctc ggc cac agg gac Met Ser Trp Ile Gln Ser Ile Pro Phe Val His Leu Gly His Arg Asp 305 310 315 320			960
gcc ctc gag gac gac ctc ctc aac cgg aac aac tcc ttc aag ccc ttc Ala Leu Glu Asp Asp Leu Leu Asn Arg Asn Asn Ser Phe Lys Pro Phe 325 330 335			1008
gcc gaa tac aag tcc gac tac gtc tac cag ccc ttc ccc aag acc gtc Ala Glu Tyr Lys Ser Asp Tyr Val Tyr Gln Pro Phe Pro Lys Thr Val 340 345 350			1056
tgg gag cag atc ctc aac acc tgg ctc gtc aag ccc ggc gcc ggg atc Trp Glu Gln Ile Leu Asn Thr Trp Leu Val Lys Pro Gly Ala Gly Ile 355 360 365			1104
atg atc ttc gac ccc tac ggc gcc acc atc agc gcc acc ccg gag tcc Met Ile Phe Asp Pro Tyr Gly Ala Thr Ile Ser Ala Thr Pro Glu Ser 370 375 380			1152
gcc acg ccc ttc cct cac cgc aag ggc gtc ctc ttc aac atc cag tac Ala Thr Pro Phe Pro His Arg Lys Gly Val Leu Phe Asn Ile Gln Tyr 385 390 395 400			1200
gtc aac tac tgg ttc gcc ccg gga gcc gcc gcc gcg ccc ctc tcg tgg Val Asn Tyr Trp Phe Ala Pro Gly Ala Ala Ala Pro Leu Ser Trp 405 410 415			1248
agc aag gac atc tac aac tac atg gag ccc tac gtg agc aag aac ccc Ser Lys Asp Ile Tyr Asn Tyr Met Glu Pro Tyr Val Ser Lys Asn Pro 420 425 430			1296
agg cag gcg tac gca aac tac agg gac atc gac ctc ggc agg aac gag Arg Gln Ala Tyr Ala Asn Tyr Arg Asp Ile Asp Leu Gly Arg Asn Glu 435 440 445			1344
gtg gtc aac gac gtc tcc acc tac gcc agc ggc aag gtc tgg ggc cag Val Val Asn Asp Val Ser Thr Tyr Ala Ser Gly Lys Val Trp Gly Gln 450 455 460			1392
aaa tac ttc aag ggc aac ttc gag agg ctc gcc att acc aag ggc aag			1440

- 30 -

Lys Tyr Phe Lys Gly Asn Phe Glu Arg Leu Ala Ile Thr Lys Gly Lys
 465 470 475 480
 gtc gat cct acc gac tac ttc agg aac gag cag agc atc ccg ccg ctc 1488
 Val Asp Pro Thr Asp Tyr Phe Arg Asn Glu Gln Ser Ile Pro Pro Leu
 485 490 495
 atc aaa aag tac tga 1503
 Ile Lys Lys Tyr
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<210> 12

<211> 500

<212> PRT

<213> Phleum pratense

<400> 12

Tyr Phe Pro Pro Pro Ala Ala Lys Glu Asp Phe Leu Gly Cys Leu Val
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 Lys Glu Ile Pro Pro Arg Leu Leu Tyr Ala Lys Ser Ser Pro Ala Tyr
 20 25 30
 Pro Ser Val Leu Gly Gln Thr Ile Arg Asn Ser Arg Trp Ser Ser Pro
 35 40 45
 Asp Asn Val Lys Pro Leu Tyr Ile Ile Thr Pro Thr Asn Val Ser His
 50 55 60
 Ile Gln Ser Ala Val Val Cys Gly Arg Arg His Ser Val Arg Ile Arg
 65 70 75 80
 Val Arg Ser Gly Gly His Asp Tyr Glu Gly Leu Ser Tyr Arg Ser Leu
 85 90 95
 Gln Pro Glu Thr Phe Ala Val Val Asp Leu Asn Lys Met Arg Ala Val
 100 105 110
 Trp Val Asp Gly Lys Ala Arg Thr Ala Trp Val Asp Ser Gly Ala Gln
 115 120 125
 Leu Gly Glu Leu Tyr Tyr Ala Ile Tyr Lys Ala Ser Pro Thr Leu Ala
 130 135 140
 Phe Pro Ala Gly Val Cys Pro Thr Ile Gly Val Gly Gly Asn Phe Ala
 145 150 155 160

Gly Gly Gly Phe Gly Met Leu Leu Arg Lys Tyr Gly Ile Ala Ala Glu
165 170 175

Asn Val Ile Asp Val Lys Leu Val Asp Ala Asn Gly Lys Leu His Asp
180 185 190

Lys Lys Ser Met Gly Asp Asp His Phe Trp Ala Val Arg Gly Gly Gly
195 200 205

Gly Glu Ser Phe Gly Ile Val Val Ala Trp Gln Val Lys Leu Leu Pro
210 215 220

Val Pro Pro Thr Val Thr Ile Phe Lys Ile Ser Lys Thr Val Ser Glu
225 230 235 240

Gly Ala Val Asp Ile Ile Asn Lys Trp Gln Val Val Ala Pro Gln Leu
245 250 255

Pro Ala Asp Leu Met Ile Arg Ile Ile Ala Gln Gly Pro Lys Ala Thr
260 265 270

Phe Glu Ala Met Tyr Leu Gly Thr Cys Lys Thr Leu Thr Pro Leu Met
275 280 285

Ser Ser Lys Phe Pro Glu Leu Gly Met Asn Pro Ser His Cys Asn Glu
290 295 300

Met Ser Trp Ile Gln Ser Ile Pro Phe Val His Leu Gly His Arg Asp
305 310 315 320

Ala Leu Glu Asp Asp Leu Leu Asn Arg Asn Asn Ser Phe Lys Pro Phe
325 330 335

Ala Glu Tyr Lys Ser Asp Tyr Val Tyr Gln Pro Phe Pro Lys Thr Val
340 345 350

Trp Glu Gln Ile Leu Asn Thr Trp Leu Val Lys Pro Gly Ala Gly Ile
355 360 365

Met Ile Phe Asp Pro Tyr Gly Ala Thr Ile Ser Ala Thr Pro Glu Ser
370 375 380

Ala Thr Pro Phe Pro His Arg Lys Gly Val Leu Phe Asn Ile Gln Tyr
385 390 395 400

Val Asn Tyr Trp Phe Ala Pro Gly Ala Ala Ala Ala Pro Leu Ser Trp
405 410 415

- 32 -

Ser Lys Asp Ile Tyr Asn Tyr Met Glu Pro Tyr Val Ser Lys Asn Pro
420 425 430

Arg Gln Ala Tyr Ala Asn Tyr Arg Asp Ile Asp Leu Gly Arg Asn Glu
435 440 445

Val Val Asn Asp Val Ser Thr Tyr Ala Ser Gly Lys Val Trp Gly Gln
450 455 460

Lys Tyr Phe Lys Gly Asn Phe Glu Arg Leu Ala Ile Thr Lys Gly Lys
465 470 475 480

Val Asp Pro Thr Asp Tyr Phe Arg Asn Glu Gln Ser Ile Pro Pro Leu
485 490 495

Ile Lys Lys Tyr
500

<210> 13

<211> 12

<212> PRT

<213> Dactylus glomerata

<400> 13

Asp Ile Tyr Asn Tyr Met Glu Pro Tyr Val Ser Lys
1 5 10

<210> 14

<211> 11

<212> PRT

<213> Dactylus glomerata

<400> 14

Val Asp Pro Thr Asp Tyr Phe Gly Asn Glu Gln
1 5 10

<210> 15

<211> 17

<212> PRT

<213> Dactylus glomerata

<400> 15

Ala	Arg	Thr	Ala	Trp	Val	Asp	Ser	Gly	Ala	Gln	Leu	Gly	Glu	Leu	Ser
1				5				10						15	

Tyr

<210> 16

<211> 15

<212> PRT

<213> Dactylus glomerata

<400> 16

Gly	Val	Leu	Phe	Asn	Ile	Gln	Tyr	Val	Asn	Tyr	Trp	Phe	Ala	Pro
1				5					10					15

<210> 17

<211> 11

<212> PRT

<213> Cynodon dactylon

<400> 17

Lys	Thr	Val	Lys	Pro	Leu	Tyr	Ile	Ile	Thr	Pro
1				5					10	

<210> 18

<211> 22

<212> PRT

<213> Cynodon dactylon

<400> 18

Lys	Gln	Val	Glu	Arg	Asp	Phe	Leu	Thr	Ser	Leu	Thr	Lys	Asp	Ile	Pro
1				5					10					15	

Gln Leu Tyr Leu Lys Ser
20

<210> 19

<211> 16

<212> PRT

<213> Cynodon dactylon

<400> 19

Thr Val Lys Pro Leu Tyr Ile Ile Thr Pro Ile Thr Ala Ala Met Ile
1 5 10 15

<210> 20

<211> 24

<212> PRT

<213> Cynodon dactylon

<400> 20

Leu Arg Lys Tyr Gly Thr Ala Ala Asp Asn Val Ile Asp Ala Lys Val
1 5 10 15

Val Asp Ala Gln Gly Arg Leu Leu
20

<210> 21

<211> 14

<212> PRT

<213> Cynodon dactylon

<400> 21

Lys Trp Gln Thr Val Ala Pro Ala Leu Pro Asp Pro Asn Met
1 5 10

<210> 22

<211> 15

<212> PRT

- 35 -

<213> Cynodon dactylon

<400> 22

Val	Thr	Trp	Ile	Glu	Ser	Val	Pro	Tyr	Ile	Pro	Met	Gly	Asp	Lys
1				5					10					15

<210> 23

<211> 19

<212> PRT

<213> Cynodon dactylon

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Gly Lys Tyr

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